magnification pattern. Then, the changeover switch **80** switches to the high magnification memory **84**, where a reference high magnification pattern is stored and registered. In this case, the position and shape of the pattern are stored in the high magnification frame memory **84**. The registration of two patterns of low magnification and high magnification is completed.

A description will be given of the method of aligning the wafer in accordance with the reference patterns which are registered in the above-mentioned manner with reference to FIGS. **5** and **6**.

At step **S100**, the wafer W on the cutting table **12** is moved to an alignment position, and the microscopes **76**, **77** are moved to alignment positions in a channel **1**. Then, a rough-alignment of the wafer is performed in accordance with the low magnification pattern in the channel **1** at the step **S110**. Specifically, as shown in FIG. **6**(A), the two microscopes **76**, **77** are moved to the positions ① and ① in proximity to the center O of the wafer W, and two patterns at these positions are imaged at the same time. On the other hand, in the alignment equipment, the reference low magnification pattern is transmitted from the low magnification frame memory **82** to the comparator **90**, and the current image patterns at the positions ① and ①, which are imaged by the microscopes **76**, **77**, are transmitted from the current image frame memory **86** to the comparator **90**. The comparator **90** performs a pattern matching process, and the results are transmitted to the controller **92**. The controller **92** performs a rough alignment by driving the X-Y drive mechanism **72** and the rotational driving mechanism **74** so that the current image patterns can match with the reference low magnification pattern, and the rough alignment in accordance with the reference low magnification pattern is completed.

Next, the rough alignment based on the low magnification pattern is performed in the channel **1** at step **S120**. Specifically, as shown in FIG. **6**(A), the two microscopes **76**, **77** are moved to positions ② and ② in proximity to the outer circumference of the wafer W, and two patterns at these positions are imaged at the same time. On the other hand, in the alignment equipment, the reference low magnification pattern is transmitted from the low magnification frame memory **82** to the comparator **90**, and the current image patterns at the positions ② and ②, which are imaged by the microscopes **76**, **77**, are transmitted from the current image frame memory **86** to the comparator **90**. Then, the comparator **90** performs the pattern matching process, and the results are transmitted to the controller **92**. The controller **92** performs the rough alignment by driving the X-Y driving mechanism **72** and the rotational driving mechanism **74** so that the current image patterns can match with the reference low magnification pattern, and the rough alignment in accordance with the low magnification pattern is completed.

Next, a fine alignment is performed in accordance with the high magnification pattern in the channel **1** at step **130**. Specifically, the switching device **88** is switched to the high magnification frame memory **84** side, and the two microscopes **76**, **77** in FIG. **6**(B) are switched from the low magnification to the high magnification in a stationary state at the positions ② and ② (the positions ③ and ③), and two patterns at the positions ③ and ③ are imaged. In the alignment equipment, the reference high magnification pattern is transmitted from the high magnification frame memory **84** to the comparator **90**, and the current image patterns at the positions ③ and ③, which are imaged by the two microscopes **76**, **77**, are transmitted from the current image frame memory **86** to the comparator **90**. The comparator **90** performs the pattern matching process, and the results are transmitted to the controller **92**. The controller **92** performs the fine alignment by driving the X-Y driving mechanism **72** and the rotational driving mechanism **74** so that the reference high magnification pattern can match with the current image pattern, and the fine alignment in the channel **1** is completed.

Next, the channel **1** is switched to the channel **2**, and the cutting table **12** is turned 90° by the rotational driving mechanism **74**. The fine alignment is performed in accordance with the high magnification pattern in the channel **2** at step **S150**. Specifically, the cutting table **12** is turned 90° with the two microscopes **76**, **77** in a stationary state at the positions ③ and ③, and two patterns at the positions ④ and ④ are imaged. In the alignment equipment, the reference high magnification pattern in the channel **2** is transmitted from the high magnification frame memory **84** to the comparator **90**, and the current image patterns at the positions ④ and ④, which are imaged by the microscopes **76**, **77**, are transmitted to the comparator **90**. The comparator **90** performs the pattern matching process, and the results are transmitted to the controller **92**. The controller **92** performs the fine alignment by driving the X-Y driving mechanism **72** and the rotational driving mechanism **74** so that the reference low magnification pattern can match with the current image patterns. The alignment equipment of this invention finishes aligning the wafer W.

As stated above, according to the alignment method of this embodiment, the imaging equipment **18**, **19** are provided at a pair of cutting blade units **14**, **16**, and the two imaging equipment **18**, **19** image the patterns at two points in proximity to the center of the wafer W so as to align the wafer W. For this reason, compared with the conventional alignment method wherein the patterns are imaged on a point-by-point basis, the alignment can be performed at higher speed in a shorter period of time.

In this embodiment, two imaging equipment image the patterns at two positions ③ and ③ in the rough alignment. The present invention, however, should not be restricted to this. One imaging equipment may image only one pattern at one point to align the wafer.

Moreover, in this embodiment, the reference low magnification pattern and the reference high magnification pattern can be imaged without the necessity for moving the imaging equipment **18**, **19**. For this reason, the processing time can be reduced dramatically compared with the conventional alignment apparatus in which the imaging equipment must be moved to each pattern subject to imaging.

As set forth hereinabove, according to the alignment method and apparatus of this invention, the pair of cutting blade units are provided with the imaging means, and the two imaging means image the patterns at two points in proximity to the center of the workpiece at the same time to align the wafer. For this reason, compared with the conventional alignment method wherein the patterns are imaged on a point-by-point basis, the alignment can be performed at higher speed in a shorter period of time.

It should be understood, however, that there is no intention to limit the invention to the specific forms disclosed, but on the contrary, the invention is to cover all modifications, alternate constructions and equivalents falling within the spirit and scope of the invention as expressed in the appended claims.

What is claimed is:

1. A method of aligning cutting lines of a workpiece, which depend on patterns, with a pair of cutting blades

provided at a pair of cutting blade units provided with motors for rotating said pair of cutting blades, the alignment being performed when said pair of cutting blade units cuts said workpiece, said alignment method comprising the steps of:

registering reference patterns at at least one point of low magnification and one point of high magnification on said workpiece located at a preset position;

simultaneously producing images of patterns at two points in proximity to the center of said workpiece with two imaging means provided at said pair of cutting blade units, and aligning said workpiece such that the images of the patterns at said two points can match with said reference patterns; and

moving either one of said two imaging means to a position so as to produce an image of a pattern at one point at the outer circumference of said workpiece and aligning said workpiece such that the image of the pattern at the point at the outer circumference can match with said reference patterns.

2. The method as defined in claim 1, further comprising the steps of producing images of reference patterns of the low magnification and the high magnification on said workpiece with the use of said two imaging means after having registered the reference patterns of the low magnification and the high magnification.

3. A method of aligning cutting lines of a workpiece, which depend on patterns, with a pair of cutting blades provided at a pair of cutting blade units provided with motors for rotating said pair of cutting blades, the alignment being performed when said pair of cutting blade units cuts said workpiece, said alignment method comprising the steps of:

registering reference patterns at at least one point of low magnification and one point of high magnification on said workpiece located at a preset position;

simultaneously producing images of patterns at two points in proximity to the center of said workpiece with two imaging means provided at said pair of cutting blade units, and aligning said workpiece such that the images of the patterns at said two points can match with said reference patterns of the low magnification;

moving at least one of said two imaging means to a position so as to produce an image of a pattern at one point at the outer circumference of said workpiece and aligning said workpiece such that the image of the pattern at the point at the outer circumference can match with said at least one reference pattern of the low magnification;

switching the magnification from the low magnification to the high magnification, producing a second image of a pattern at one point at the outer circumference of said workpiece with said at least one of said two imaging means, and aligning said workpiece so that the second image at the point at the outer circumference can match with said at least one reference pattern of high magnification; and

rotating said workpiece 90°, producing a rotated image of a pattern at one point at the outer circumference of said workpiece with said at least one of said two imaging means, and aligning said workpiece so that the rotated image at said one point can match with said at least one reference pattern of high magnification.

4. The method as defined in claim 2, further comprising the steps of producing images of reference patterns of the low magnification and the high magnification on said workpiece with the use of said two imaging means after having registered the reference patterns of the low magnification and the high magnification.

* * * * *

5. An alignment apparatus for aligning cutting lines of a workpiece, which depend on patterns, said alignment apparatus comprising:

workpiece mounting means provided with an X-Y direction driving mechanism and a rotational direction driving mechanism;

two imaging means provided producing images of patterns on said workpiece mounted on said workpiece mounting means;

storage means in which reference patterns at at least one point of low magnification and one point of high magnification on said workpiece located at a preset position are registered in advance;

pattern matching means for comparing current images of patterns on said workpiece from said two imaging means with said reference patterns of the low magnification and the high magnification stored in said storage means and outputting a pattern matching signal reflecting the degree to which the current images match the stored reference patterns; and

control means for driving said workpiece mounting means in accordance with the output of said pattern matching means to align said workpiece at a desired position.

6. A dicing machine having an alignment apparatus for aligning cutting lines of a workpiece, and cutting blade units for slicing a workpiece into semiconductor wafers, said cutting blade units being provided with a pair of cutting blades and motors for rotating said pair of cutting blades, wherein said alignment apparatus comprises:

workpiece mounting means provided with an X-Y direction driving mechanism and a rotational direction driving mechanism;

two imaging means provided at said pair of cutting blade units and producing images of patterns on said workpiece mounted on said workpiece mounting means;

storage means in which reference patterns at at least one point of low magnification and one point of high magnification on said workpiece located at a preset position are registered in advance;

pattern matching means for comparing current images of patterns on said workpiece from said two imaging means with said reference patterns of the low magnification and the high

magnification stored in said storage means and outputting a pattern matching signal reflecting the degree to which the current images match the stored reference patterns; and

control means for driving said workpiece mounting means in accordance with the output of said pattern matching means to align said workpiece at a desired position.